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On the effect of powerful microwave radiation on powdered mixtures of granular metals and oxides

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An analysis of experiments with pulsed action of gyrotron radiation with an intensity of 30 kW/cm^2 and a duration of about 10 ms on the interface between powder and air at atmospheric pressure was performed. The powder contained polydisperse particles 5–10 μm in size, consisting of various metals (aluminum, copper, iron, silver, or platinum) and various oxides. The problem of scattering powder particles from its surface into the surrounding gas is considered. For this purpose, heating processes of granules of various sizes due to microwave absorption were analyzed. Estimates were made of the scattering of dust particles into the atmosphere due to an increase in gas pressure in the pores of the powder and the emergence of repulsive forces due to their charging in the plasma (Coulomb explosion).

Keywords: microwave radiation, gyrotron, metal microparticles, plasma-chemical processes.

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